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10/538,388

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Kyung Woon Kim

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HOSOON LEE

9600 SW OAK ST. SUITE 525

TIGARD, OR 97223

EXAMINER

TAI, XIUYU

ART UNIT

PAPER NUMBER

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/538,388	<b>Applicant(s)</b> KIM ET AL.	
	<b>Examiner</b> Xiuyu Tai	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 5-30 is/are pending in the application.
- 4a) Of the above claim(s) 9-12, 14-19, 21, 23, 24 and 26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-8, 13, 20, 22, 25 and 27-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/13/2005</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Claims, 9, 14, 21, 23, 24, and 26 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 5/4/2009.

Applicant's response to species election filed on 5/4/2009 fails to indicate that claims 10-12, and 15-19 are withdrawn from further consideration because of dependency on the above non-elected invention, namely claims 9 and 14. During a telephone conversation with Hosoon Lee made on 8/10/2009, a further election was made without traverse to withdraw claims 10-12, and 15-19. Claims 5-8, 13, 20, 22, 25, and 27-30 will be examined on the merits.

### ***Information Disclosure Statement***

2. The information disclosure statement filed 6/13/2005 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because applicants did not provide a concise explanation of relevance of foreign patent document cited in IDS. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 5-8, 13, 20, 22, 25, and 27-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 5 recites limitation “a shoulder”. The instant specification does not define this term clearly and the term is not conventionally known in the art.

Therefore, appropriate correction/clarification is required. It appears that “a shoulder” is a part of a hole that connects with the electrode via a neck part (page 10 line 2-5). In the light of the instant specification, “a shoulder” will be interpreted as a part of a hole that connects with an electrode. Because of their dependency, claims 6-8, 13, 20, 22, 25, and 27- 30 are rejected.

6. Claim 7 recites limitations “an electric connecting part” and “a non-electric connects part”. The instant specification does not define this term clearly and the term is not conventionally known in the art. Therefore, appropriate correction/clarification is required. In the light of the instant specification (page 15, line 24-27), “an electric connecting part” is interpreted as a part of coupler element that is in contact with electrode in the electric connecting coupling hole while “a non electric connecting part” is interpreted as a part of coupler element that is NOT in contact with electrode in the non electric connecting coupling hole.

7. Claim 13 recites limitations “a small diameter”. It is not clear if “a small diameter” of “the electric connecting coupling hole” in line 5 is the same as “a

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small diameter" of "the non electric connecting coupling hole" in line 6, or "a small diameter" of "the non electric connecting coupling hole" in line 7. Therefore, appropriate correction/clarification is required. For the purpose of examination, the three "a small diameter" will be treated as the same size in diameter.

8. Claim 20 recites limitation "a change of an inner diameter of the coupling hole". It seems impossible to lead to a change in the inner diameter since the limitation recites one coupling hole (i.e. the coupling hole) with one inner diameter (i.e. an inner diameter). Therefore, appropriate clarification is required. For the purpose of examination, the shoulder cited in claim 20 will be interpreted as "the shoulder is a circular step".

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 5, 20, 22, 25, 27, and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al (US PG-PUB. 2002/0174938).

11. Regarding claim 5, Li et al disclose a non thermal plasma reactor (ABSTRACT). The plasma reactor is a laminated embedded-conductor multi-cell men thermal plasma reactor (Figure 22; paragraph [0110]). Each cell comprises: (1) ceramic plate pairs 144 (i.e. a dielectric member, Figure 16, paragraph [0108]); (2) an electrode 126 sandwiched between ceramic plates 144 (Figure

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16, paragraph [0108]); (3) two sets of vias 1110 on ceramic plate 100, wherein one set is connected to the electrode 126 (i.e. electric connecting coupling hole on one side) and the other set is separated from the electrode 126 and located on the opposing side the ceramic plate (i.e. non-electric connecting coupling hole on the other side, element 110 in Figure 5, paragraph [0101]); and (4) the vias 110 connected to the electrode 126 through a conductive lead 127 (i.e. a shoulder, Figure 5, paragraph [0101]). The multi-cell is prepared by stacking a plurality of laminated cell 148 with spacers 146 (i.e. spacer) forming gas passages 162 (i.e. gap) and bus lines 161/163 (electric conductive coupler) are established through vias 110 interconnecting alternatively (Figure 22, paragraph [0110]). The bus lines 161/163 are in contact with vias 110 for interconnecting the laminated electrode (paragraph [0110]). Plasma is generated between adjacent cell by applying power through bus lines 161/163 to electrode 148 (paragraph [0110]).

12. Regarding claim 20, the vias 110 on the ceramic plate pairs forms a circular step (Figure 16).

13. Regarding claim 22, as shown in Figures 14 & 15, the bus lines 161/163 are inserted through vias 110 and through holes on spacers 146 (paragraph [0107]).

14. Regarding claim 25, inked via cover pad 130 is provided between the vias 110 to connect the electrode 124 (Figure 5, paragraph [0103]).

15. Regarding claim 27, the electrode 126 has a via section 110 (i.e. hole surrounding part), a main electrode portion 124 (i.e. a discharging part), and a

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terminal lead 127 (i.e. neck part) that is narrower and connects between the vias 110 and electrode part 124 (Figure 5, paragraph [0101]).

16. Regarding claim 28, the reference teaches that one or more layers of ceramic tape 100 can be laminated and the ceramic material can be glass ceramic that is a porosity reduction material (paragraph [0099]).

### ***Claim Rejections - 35 USC § 103***

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

19. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor

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and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

20. Claims 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (US PG-PUB. 2002/0174938) as applied to claim 28 above.

21. Regarding claim 29, one ceramic plate is inked with electrode while the other matching ceramic plate is free of any main electrode paint (Figure 13 & 16, paragraph [0106]). It should be noted that the claim contains product (electrode plate) by process (bonding) language. Bonding method does not impart any unexpected significant properties of electrode to the plasma reactor. Therefore, the claimed product produced from bonding method appears to have similar characteristics as the disclosed product. Because of the nature of product-by-process claims, the Examiner cannot ordinarily focus on the precise difference between the claimed product and the disclosed product. It is then Applicants' burden to prove that an unobvious difference exists. See *In re Marosi*, 218 USPQ 289,292-293 (CAFC 1983).

22. Regarding claim 30, the claim contains product (electrode plate) by process (bonding) language. Bonding method does not impart any unexpected significant properties of electrode to the plasma reactor. Therefore, the claimed product produced from bonding method appears to have similar characteristics as the disclosed product. Because of the nature of product-by-process claims, the



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Examiner cannot ordinarily focus on the precise difference between the claimed product and the disclosed product. It is then Applicants' burden to prove that an unobvious difference exists. See *In re Marosi*, 218 USPQ 289,292-293 (CAFC 1983).

23. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (US PG-PUB. 2002/0174938) as applied to claim 5 above, and further in view of Shiloh et al (U.S. 6,245,299)

24. Regarding claim 6, Li does not teach that the bus lines 161/163 comprise a plurality of coupler elements. However, Shiloh et al disclose a DBD modular for plasma device. The modular DBD device 10 comprises a plurality of cells 12 (Figure 1, col. 3, line 26-27) and each cell is joined by threaded element 32/36 (Figure 3, col. 7, line 3-5). The joined element is threaded into an integrated part. Shiloh indicates that the utilizing threaded joining element can easily change the gas width of the cell, hence adjust the performance of the modular accordingly (col. 5, line 2-3). Therefore, it would be obvious for one having ordinary skill in the art to utilize the threaded joining element as suggested by Shiloh in order to easily change the gap of the plasma reactor of Li.

25. Regarding claim 7, the joined element comprises: (1) an upper part 32(i.e. an electric connecting part) that is in contact with electrode and has a threaded hole where the threaded rod 36 is inserted (Figure 3, col. 5, line 1-10); (2) the upper part of threaded rod 36 that is not contact with the electrode (i.e. a non electric connecting part); and (3) the lower part of the threaded rod 36 ( i.e. a

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joining part) inserted into the threaded hole 34 to join two electrode plates 14j and 16j (Figure 3; col. 5, line 3-10).

26. Regarding claim 8, the upper part of threaded rod 36 is between the threaded upper part 32 and the lower part of the threaded rod 36 (Figure 3; col. 5, line 3-10). The threaded upper part 32 has bigger outer diameter the threaded rod 36 (Figure 3). The upper part and the lower part of threaded rod 36 appears have the same size in outer diameter. The threaded upper part 32 has a shoulder part (Figure 3). The threaded rod 36 has matching thread for threaded upper part 32 and the threaded lower part 34 (Figure 3 col. 5, line 5-10).

27. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (US PG-PUB. 2002/0174938) as applied to claim 5 above, and further in view of Morita et al (U.S. 6,039,816)

28. Regarding claim 12, Li teaches each electrode plate having two ceramic plate pairs 144 (i.e. a first dielectric plate and a second dielectric plate, Figures 5 & 13, paragraph [0101] & [0106]) with electrode 126 on one ceramic plate (Figure 13 & 16, paragraph [0106]). Two sets of vias 110 are provided on both ceramic plates 144 (i.e. holes on both dielectric plates, Figures 5 & 13, paragraph [0101] & [0106]) and the vias 110 on each ceramic plate appear the same size (i.e. holes on the first dielectric plate with a small diameter). Vias 110 on both ceramic plates are aligned (i.e. vias arranged in line Figure 13 & 22, paragraph [0107]), but the reference does not teach that the vias 110 on one of the ceramic plates have different sizes. Morita et al disclose an ozonizer for applying corona discharge. The ozonier element 60 contains dielectric layers 62/64, discharge

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electrode 68, induction electrode 66 (Figure 2a; col. 8, line 22-25), and different sizes of terminals 66a (a small size) and terminal 68a (a large size terminal) connected to a power supply (Figure 2b; col. 8, line 38-40). Morita also indicates that the ozonizer with such arrangement results in continuous generation of discharge (col. 1, line 8-10). Therefore, it would be obvious for one having ordinary skill in the art to utilize a plasma reactor with vias having different sizes as suggested by Morita in order to efficiently and continuously generated discharge in the plasma reactor of Li.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuyu Tai whose telephone number is 571-270-1855. The examiner can normally be reached on Monday - Friday, 7:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer Michener can be reached on 571-272-1424. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/X. T./  
Examiner, Art Unit 1795

/Jennifer K. Michener/  
Supervisory Patent Examiner, Art Unit 1795